

## CLAIMS

I claim:

1        1.    A method for inducing spin excitation within an  
2    object in a magnetic resonance imaging system that includes  
3    a transmit inductor system, said object having one or more  
4    intrinsic relaxation time constants, said method comprising  
5    the steps of:

6        (a)   providing said transmit inductor system with the  
7    ability to generate a plurality of RF transmissions with  
8    different spatial characteristics;

9        (b)   generating a first RF transmission from said  
10   transmit inductor system with first spatial characteristics;  
11   and

12        (c)   prior to expiration of the longest of said  
13   intrinsic relaxation time constants, generating a second RF  
14   transmission from said transmit inductor system with second  
15   spatial characteristics different from said first spatial  
16   characteristics;

17        (d)   whereby said spin excitation is induced by the  
18   combined effects of said first RF transmission and said  
19   second RF transmission.

1        2.    The method of claim 1 wherein there is a time gap  
2    between said first RF transmission and said second RF  
3    transmission.

1           3.     The method of claim 1 wherein there is no time gap  
2 between said first RF transmission and said second RF  
3 transmission.

1           4.     The method of claim 1 wherein said first RF  
2 transmission is temporally overlapped by said second RF  
3 transmission.

1           5.     The method of claim 1 wherein said method further  
2 comprises generating additional RF transmissions after said  
3 second RF transmission.

1           6.     The method of claim 1 wherein said transmit  
2 inductor system is provided with a volume coil having a  
3 primary mode and a gradient mode, said first RF transmission  
4 being generated by said volume coil in said primary mode and  
5 said second RF transmission being generated by said volume  
6 coil in said gradient mode.

1           7.     The method of claim 1 wherein said transmit  
2 inductor system is provided with a volume coil and at least  
3 one surface coil, said first RF transmission being generated  
4 by said volume coil and said second RF transmission being  
5 generated by said at least one surface coil.

1           8.     The method of claim 1 wherein said transmit  
2 inductor system includes a plurality of surface coils, each  
3 of said RF transmissions being generated by at least one of  
4 said surface coils.

1        9.    The method of claim 1 wherein said first RF  
2    transmission transitions to said second RF transmission by  
3    continuously varying said spatial characteristics generated  
4    by said transmit inductor system.

1        10.   A method for inducing spin excitation within an  
2    object in a magnetic resonance imaging system that includes  
3    a transmit inductor system, said method comprising the steps  
4    of:

5        (a)   providing said transmit inductor system with the  
6    ability to generate an RF transmission with continuously  
7    time-varying spatial characteristics; and

8        (b)   generating an RF transmission from said transmit  
9    inductor system with spatial characteristics that change as  
10   a function of time;

11       (c)   whereby said spin excitation is induced by the  
12   combined effects of said spatial characteristics that change  
13   as a function of time.

1        11.   The method of claim 10 wherein said object has one  
2    or more intrinsic relaxation time constants and said RF  
3    transmission has a duration of not longer than the longest  
4    of said intrinsic relaxation time constants.